37392

easYgen-1000
Genset Control

Operation
Software Version 2.1xxx

Manual 37392

WARNING

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

The engine, turbine, or other type of prime mover should be equipped with an overspeed (overtemperature, or overpressure, where applicable) shutdown device(s), that operates totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the mechanical-hydraulic governor(s) or electric control(s), the actuator(s), fuel control(s), the driving mechanism(s), the linkage(s), or the controlled device(s) fail.

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

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Important definitions

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, could result in damage to equipment.

NOTE

Provides other helpful information that does not fall under the warning or caution categories.

Woodward reserves the right to update any portion of this publication at any time. Information provided by Woodward is believed to be correct and reliable. However, Woodward assumes no responsibility unless otherwise expressly undertaken.

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Revision History

Rev.	Date	Editor	Changes
NEW	07-02-05	TP	Release based on manual 37322

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Chapter 1.
General Information

Related Documents

Type		English	German
easYgen-1000 Series			
easYgen-1000 - Installation		37390	GR37390
easYgen-1000 - Configuration		37391	GR37391
easYgen-1000 - Operation	this manual ⇨	37392	GR37392
easYgen-1000 - Interface		37393	GR37393
easYgen-1000 - Application		37205	GR37205
Additional Manuals			
IKD 1 - Manual		37135	GR37135
Discrete expansion board with 8 discrete inputs and 8 relay outputs that can be coupled via the CAN bus to the control unit. Evaluation of the discrete inputs as well as control of the relay outputs is done via the control unit.			
IKN 1 - Manual		37136	GR37136
20channel NiCrNi temperature scanner that monitors the temperature values for exceeding or falling below a threshold value, measured through senders on the IKN 1. A configured relay on the board of the IKN 1 will trip. The IKN 1 can be coupled with the control unit using the CAN bus to display measuring values as well as alarms.			
LeoPC1 - User Manual		37146	GR37146
PC program for visualization, configuration, remote control, data logging, language upload, alarm and user management, and management of the event recorder. This manual describes the set up of the program and interfacing with the control unit.			
LeoPC1 - Engineering Manual		37164	GR37164
PC program for visualization, configuration, remote control, data logging, language upload, alarm and user management, and management of the event recorder. This manual describes the configuration and customization of the program.			
GW 4 - Manual		37133	GR37133
Gateway for transferring the CAN bus to any other interface or bus.			
ST 3 - Manual		37112	GR37112
Control to govern the air fuel ratio of a gas engine. The ratio will be directly measured though a Lambda probe and controlled to a configured value.			

Table 1-1: Manual - Overview

Short Description

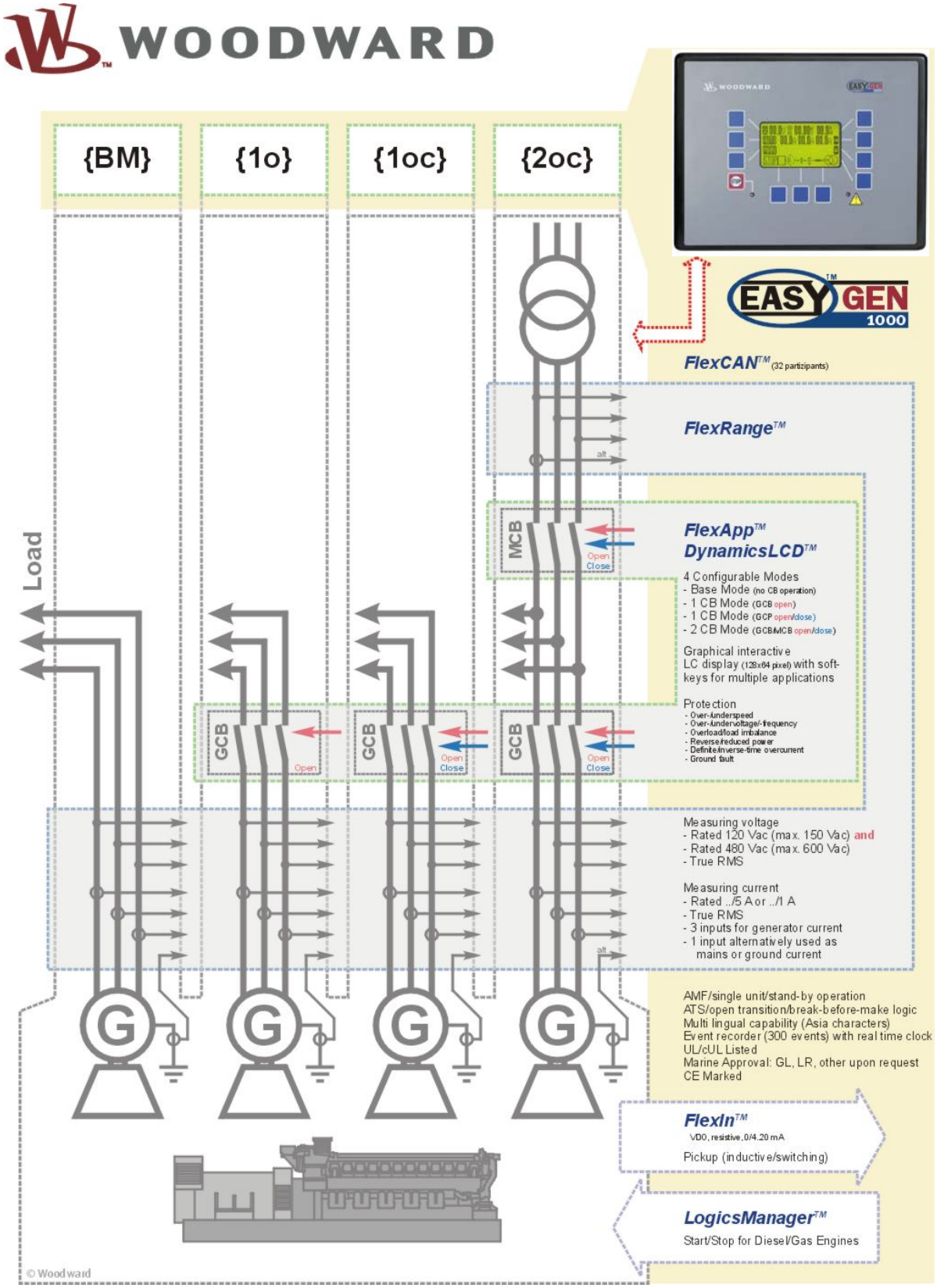
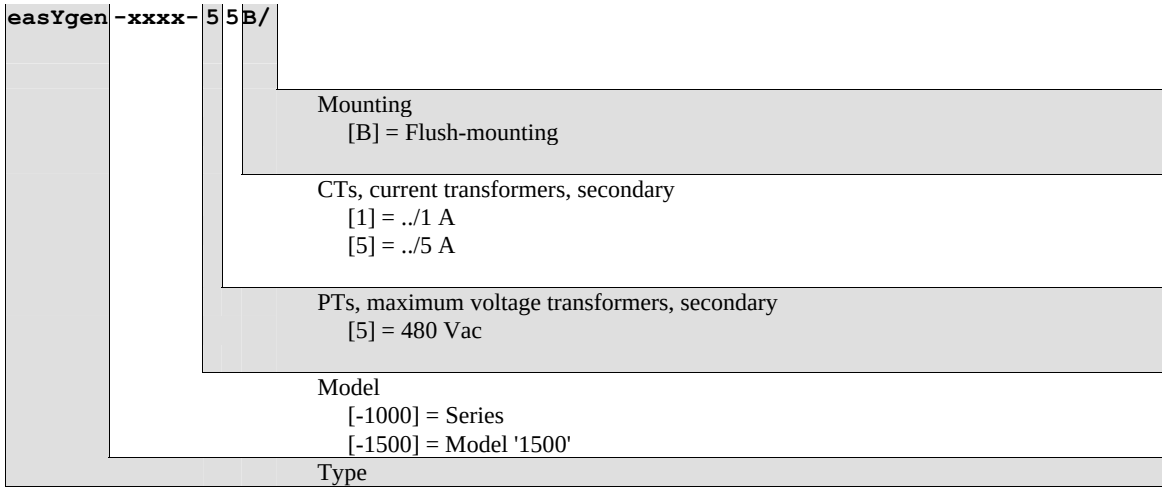


Figure 1-2: Functional overview

The easYgen-1000 Series generator set controllers provide the following functions:

- Gen-set control
- Engine and generator protection
- Engine data measurement -
  - oil pressure and temperature, coolant temperature, battery voltage, speed, service hours, etc.
- Generator data measurement -
  - voltage, current, power, kvar, kW, kWh, etc.
- Engine crank sequencing
- Alarm display with circuit breaker trip and engine shutdown
- AMF (automatic mains failure) standby genset control, with automatic engine start on a mains failure detection and open transition breaker control
- CAN bus communications to engine controllers and plant management systems

Type designation is as follows:



Examples:
EASYGEN-1500-55B (standard unit, 120 & 480 PT inputs, ../5 A CT inputs, flush-mounting)
EASYGEN-1500-51B (standard unit, 120 & 480 PT inputs, ../1 A CT inputs, flush-mounting)

Intended Use The unit must only be operated as described in this manual. The prerequisite for a proper and safe operation of the product is correct transportation, storage, and installation as well as careful operation and maintenance.

NOTE

This manual has been developed for a unit equipped with all available options. Inputs/outputs, functions, configuration screens, and other details described which do not exist on your unit may be ignored.

The present manual has been prepared to enable the installation and commissioning of the unit. Because of the large variety of parameter settings, it is not possible to cover every combination. The manual is therefore only a guide. In case of incorrect entries or a total loss of functions, the default settings may be taken from the list of parameters in the configuration manual 37391.

Chapter 2.
Navigation / Operation

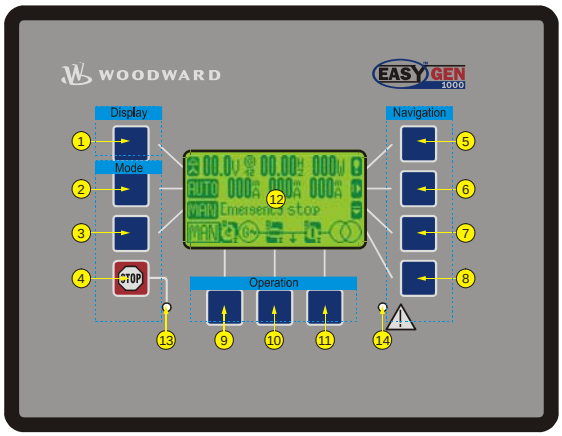


Figure 2-1: Front panel and display

Figure 2-1 illustrates the front panel/display, which includes push buttons, LEDs and the Liquid Crystal display (LC display). A short description of the front panel is given below.

NOTE

This push button is ALWAYS active and will stop the engine when pressed.

Fct.-block

Function blocks

Buttons that have the same function within one screen are grouped into function blocks. The function blocks are defined as:

Display .....Change the method of voltage and power calculations displayed (page 18).
Mode .....Change the mode of operation (page 20).
Operation ....Used to perform manual operation of the genset (page 21).
Navigation ...Navigation between system and configuration screens, and alarm list (page 21).

① ② ③ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

Push buttons

The push buttons on the front panel are assigned to softkeys on the display. Each softkey is assigned to a function depending on the mode of operation.

⑫

Liquid Crystal Display (LC display)

The display contains softkey characters, measuring values, modes of operation, and alarms. The functionality of the display screens as well as the description of the functions is detailed in the "Navigation" section (page 9).

⑬ ⑭

LED

The left LED ⑬ indicates that the unit is in STOP mode. The right LED ⑭ indicates that alarm messages are active / present in the control unit.

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Navigation

Individual display screens are listed in the following text. All softkeys, which are available in the individual screens are described with their function.

Screen "Generator values - overview" / "Starting screen" **[all application modes]**

This screen appears upon startup of the unit. The generator symbol, located along the top of the display in front of frequency, indicates that generator values are displayed. It is possible to select an alternative screen or configure five of the display fields freely (refer to the Configuration Manual 37391 for more information).

Alternative screen:

Freely configured dynamic display example:

Navigate to the next screen.

Main menu.

Switch the display of the generator voltages (between delta and wye voltages).

Display the alarm list (unacknowledged alarms).

This softkey is only displayed if the Alarm LED is flashing (An alarm is present, which has not yet been acknowledged as 'Seen'). This softkey resets the horn and acknowledges the alarm as 'Seen'.

Operating mode MANUAL: start/stop engine.

Operating mode MANUAL: GCB/MCB open/close.

Change into AUTOMATIC operating mode.

Change into MANUAL operating mode.

Change into STOP operating mode.

Screen "Mains values - overview" **[only GCB/MCB {2oc}application mode]**

This screen appears after pressing the softkey once. The mains symbol, located along the top of the display in front of frequency, indicates that the mains measuring values are displayed.

Alternative screen:

Navigate to the next screen.

Navigate to the previous screen.

Switch the display of the mains voltages (between delta and wye voltages).

Display the alarm list (with all present alarms).

Operating mode MAN: start/stop engine.

Operating mode MAN: GCB/MCB open/closed.

Change into AUTOMATIC operating mode.

Change into MANUAL operating mode.

Change into STOP operating mode.

Screen "Generator values - Details" **[all application modes]**

Note: The display may differ from this example (3Ph/4W) depending on the configured voltage system (refer to Display on page 19 for details).

This screen appears after pressing the softkey again. All measured generator values are displayed in this screen.

Navigate to the next screen.

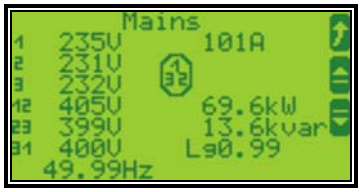
Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

1 / **2** / **3**.....Generator voltages V_{L1N} / V_{L2N} / V_{L3N} and generator currents I_{L1} / I_{L2} / I_{L3}
12 / **23** / **31**....Generator voltages V_{L12} / V_{L23} / V_{L31}
00.00Hz.....Generator frequency
000kW.....Generator real power
000kvar.....Generator reactive power
1.00.....Generator power factor = 1
Lg0.00 .....Generator power factor (lagging)
Ld0.00 .....Generator power factor (leading)
.....Phase rotation clockwise ↻
.....Phase rotation counterclockwise ↺

Screen "Mains values - Details" **[only GCB/MCB {2oc}application mode]**



Note: The display may differ from this example (3Ph/4W) depending on the configured voltage system (refer to Display on page 19 for details).

This screen appears after pressing the softkey again. All measured mains values are displayed in this screen.

Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

1 / **2** / **3**.....Mains voltages V_{L1N} / V_{L2N} / V_{L3N} and mains current I_{L1}
12 / **23** / **31**....Mains voltages V_{L12} / V_{L23} / V_{L31}
00.00Hz.....Mains frequency
000kW.....Mains real power
000kvar.....Mains reactive power
1.00.....Generator power factor = 1
Lg0.00 .....Generator power factor (lagging)
Ld0.00 .....Generator power factor (leading)
.....Phase rotation clockwise ↻
.....Phase rotation counterclockwise ↺

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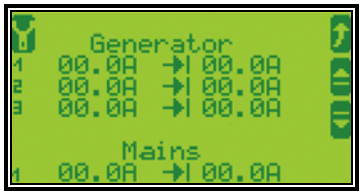
Screen "Current slave pointer " [all operating modes]



This screen appears after pressing the softkey again. The slave pointers →| show the maximum currents monitored by the control unit. If the current transformer input is configured to monitor for ground current, a mains current value does not appear here.

Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Left of the →| sign: present monitored value
Right of the →| sign: Maximum monitored values

Reset the maximum measured values.

Change into STOP operating mode.

1 / **2** / **3** ..... Generator current I_{L1} / I_{L2} / I_{L3} and mains current I_L

Screen "Measured ground current - value" [all operating modes]

If the mains current transformer input is configured to monitor for ground current, this screen appears after pressing the softkey again. The measured ground current is displayed as a numerical value here. If the mains current transformer input is configured to monitor for mains current, this screen will not be displayed.

Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Screen "Calculated ground current - value" [all operating modes]

If the mains current transformer input is configured to monitor for mains current and the ground fault monitoring is enabled, this screen appears after pressing the softkey again. The measured ground current is displayed as a numerical value here. If the mains current transformer input is configured to monitor for ground current, this screen will not be displayed.

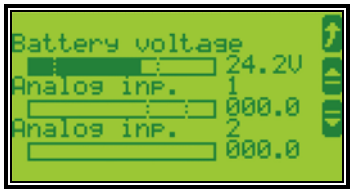
Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Screen "Analog values - Details" **[all operating modes]**



This screen appears after pressing the softkey again. The measured analog input values are displayed graphically and numerically.

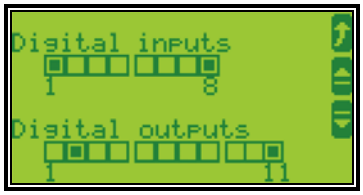
Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Screen "Discrete inputs / discrete (relay) outputs – Status display" **[all application modes]**



This screen appears after pressing the softkey again. Discrete input and discrete output status are displayed.

Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Status display of the discrete inputs and discrete outputs.
(Note: The configured logic for the discrete input "N.O./N.C." will determine how the easYgen reacts to the state ▣ of the digital input. If the respective DI is configured to N.O, the unit reacts on the energized state (▣); if it is configured to N.C., it reacts on the de-energized state □.)
Discrete input: ▣ energized
□ de-energized
Discrete output: ▣ relay activated
□ relay de-activated

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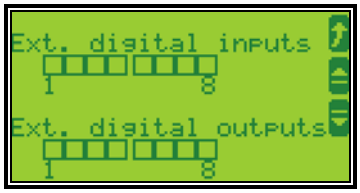
Screen "External digital inputs / relay outputs 1 to 8 - status display" **[all operating modes]**



If an external expansion card is connected to the easYgen, this screen appears after pressing the softkey again. The states of discrete inputs and discrete outputs 1 through 8 are displayed on this screen. If an external expansion card is not connected to the easYgen, this screen will not be displayed.

Navigate to the next screen.

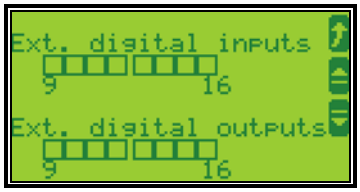
Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Status display of the external discrete inputs and outputs.
(Note: The configured logic for the discrete input "N.O./N.C." will determine how the easYgen reacts to the state ▣ of the digital input. If the respective DI is configured to N.O, the unit reacts on the energized state (▣); if it is configured to N.C., it reacts on the de-energized state □.)
Discrete input: ▣ energized
□ de-energized
Discrete output: ▣ relay activated
□ relay de-activated

Screen "External digital inputs / relay outputs 9 to 16 - status display" **[all operating modes]**



If a second external expansion card is connected to the easYgen, this screen appears after pressing the softkey again. The states of discrete inputs and discrete outputs 9 through 16 are displayed on this screen. If an external expansion card is not connected to the easYgen, this screen will not be displayed.

Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Status display of the external discrete inputs and outputs.
(Note: The configured logic for the discrete input "N.O./N.C." will determine how the easYgen reacts to the state ▣ of the digital input. If the respective DI is configured to N.O, the unit reacts on the energized state (▣); if it is configured to N.C., it reacts on the de-energized state □.)
Discrete input: ▣ energized
□ de-energized
Discrete output: ▣ relay activated
□ relay de-activated

Screen "J1939" **[all operating modes]**

This screen appears after pressing the softkey again. You may branch to a sub-directory here, which displays the list with the information sent by your ECU in J1939 protocol. If the parameter "ECU remote controlled" is configured to "On" and "Device type" is configured to "S6 Scania", the blink code entries are displayed here.

Navigate to the next screen.

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Branch to the display of the J1939 status display.

Reset Blinkcode: Reset the ECU blink code.

Blink code: Display the ECU blink code.

Indicates the blink code visually.

Screen "J1939 messages" **[all operating modes]**

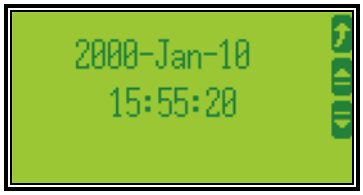
This screen appears after pressing the softkey in the J1939 screen. You may see all messages sent by your ECU here.

Return to the J1939 screen.

Scroll up to next J1939 message.

Scroll down to next J1939 message.

Screen "Time / Date" **[all operating modes]**



This screen appears after pressing the softkey in the J1939 screen. Here the time and date are displayed.

Navigate to the next screen

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

0000-XXX-00 - Date
0000 = Year
XXX = Month
00 = Day

00:00:00 - Time
00 = Hour
00 = Minute
00 = Second

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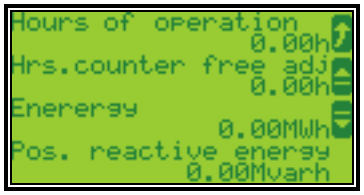
Screen "Counters I" **[all operating modes]**



This screen appears after pressing the softkey once more. Here the counters are displayed.

Navigate to the next screen

Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Hours of operation 0.00 h - Operating hours counter
0.00h = Total operating hours (hours in operation)
Hrs.counter free adj 0.00 h - free configurable hours counter
0.00h = Free configurable hours (operating hours in which the conditions configured for this counter are met; refer to the Configuration Manual 37391 for more info)
Energy 0.00 kWh - Generator real energy
0.00MWh = Total generator real energy
Pos. reactive energy 0.00 Mvar - Generator reactive energy
0.00Mvarh = Total generator reactive energy

Screen "Counters II" **[all operating modes]**

This screen appears after pressing the softkey once more. The start counter is displayed here.

Navigate to the next screen

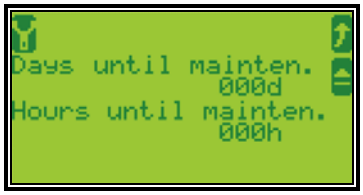
Navigate to the previous screen.

Return to the start screen.

Change into STOP operating mode.

Number of starts 00 - Start counter
00 = Total number of starts

Screen "Maintenance in..." **[all operating modes]**



This screen appears after pressing the softkey once more. Here the remaining days/hours to the next maintenance call are displayed. If the maintenance call has occurred, the display screen changes to "Maintenance overdue xxxd / xxxxh". A maximum of 999 d / 9999 h since maintenance are displayed.

Navigate to the previous screen.

Return to the start screen.

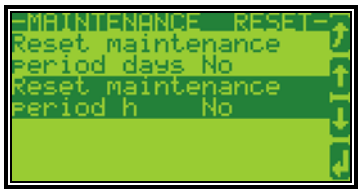
Change to the "Maintenance Reset" screen for resetting the counters to the configured values (refer to next screen for a description). This function is only available, if the unit is in the required code level (or higher). The required code level depends on the setting of the parameter "Code level for reset maintenance" (refer to manual 37391).

Change into STOP operating mode.

Days until mainten. 000d - Remaining days until maintenance is required
000d = Once the days counter reaches 000, the control unit will issue an alarm message to perform maintenance on the genset. The maintenance counter must be reset after the desired maintenance is performed.

Hours until maintenc. 000h - Remaining hours until maintenance is required
000h = Once the hours counter reaches 000, the control unit will issue an alarm message to perform maintenance on the genset. The maintenance counter must be reset after the desired maintenance is performed.

Screen "Maintenance Reset" **[all operating modes]**



This screen appears after pressing the softkey in the "Maintenance in …" screen. You are able to reset the maintenance counters here if you are in the required code level. To do this, you must select the counter to be reset and confirm with the softkey . Then you must set the parameter to "Yes" with the softkey and confirm with the softkey again. Then, the alarm may be acknowledged in the alarm list (refer to next screen for a description).

Back to the previous screen.

Scroll one option up or change parameter value.

Scroll one option down.

Confirm a selection.

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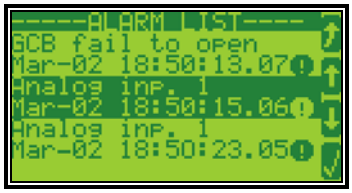
Screen "Alarm list" **[all operating modes]**



This screen appears after pressing the softkey in the start screen. All alarm messages, which have not been acknowledged and cleared, are displayed. Each alarm is displayed in two lines; the first line describes the alarm message and the second line is the date and time of the alarm occurred in the format Mon-dd hh:mm:ss.ss. The symbol indicates that this alarm condition is still present.

Return to the start screen.

Scroll up to next alarm message.

Scroll down to next alarm message.

The selected alarm message (displayed inverted) will be acknowledged. This is only possible, if the alarm condition is no longer present. If the Alarm LED is still flashing (an alarm is present, which has not yet been acknowledged as 'Seen'), this softkey resets the horn and acknowledges the alarm as 'Seen'.

Operation

The display is partitioned into different areas to give an overview of the displayed data.

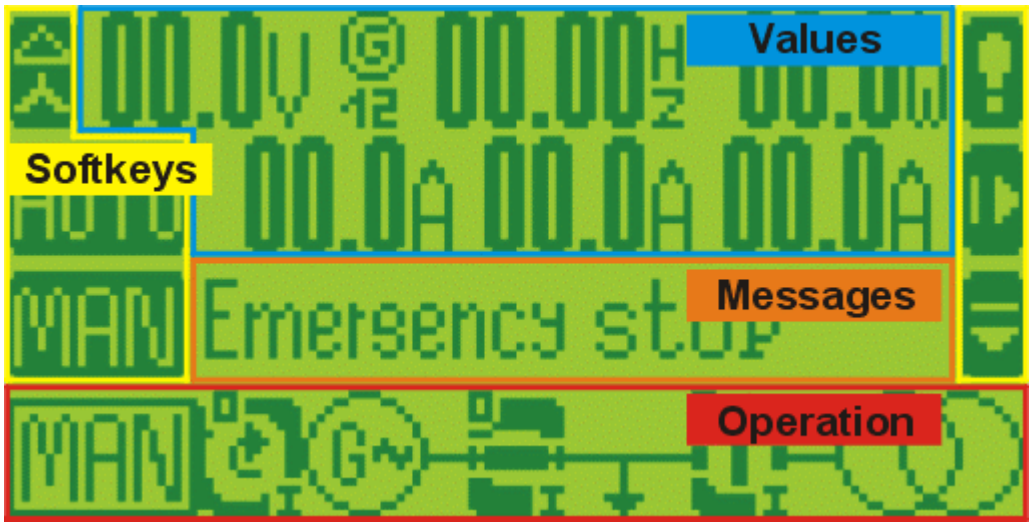
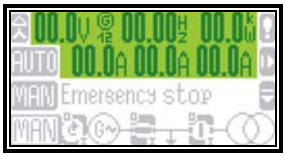


Figure 2-2: Screen - Level overview

"Values"

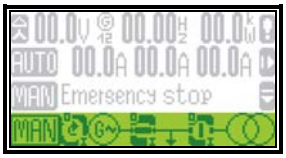


The "values" section of the screen illustrates all measured power related information including voltages, frequencies, and power values.

"Messages"

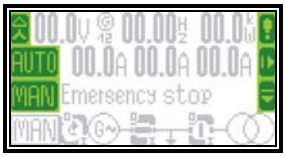
The "message" section of the screen shows all active alarms and operations information.

"Operation"



The "operation" section of the screen has a single-line diagram of the system application showing current status of the engine and power circuit breakers. This level is also used for manual operation of the genset.

"Softkeys"



The softkey characters permit navigation between screens, levels and functions.

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Display

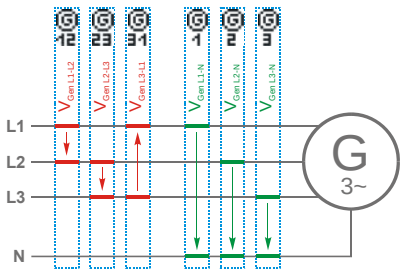
NOTE

Your unit may differ from below description if the Parameter "Alternative screens" is enabled or the main display screen is changed using the dynamic display functionality. Refer to the Configuration Manual 37391 for more detailed information.

Softkey "Voltage display"

The voltage display softkey changes the type of power calculations displayed from phase-phase to phase-neutral. The amount of information available from the system depends on how the measuring is configured in the control. Table 2-3 illustrates what values are available depending on the configured measurement type.

Selection of meas. point Soft key	Press key	Measuring point	Scroll display Soft key	Press key	Symbol of' the displayed voltage			Displayed at parameter setting 3Ph 4W	3Ph 3W	1Ph 2W	1Ph 3W
0×		Generator	0× (6×)			Delta	L1-L2	yes	yes	---	---
			1×			Delta	L2-L3	yes	yes	---	---
			2×			Delta	L3-L1	yes	yes	---	yes
			3×			Wye	L1-N	yes	---	yes	yes
			4×			Wye	L2-N	yes	---	---	---
			5×			Wye	L3-N	yes	---	---	yes
1×		Mains	0× (6×)			Delta	L1-L2	yes	yes	---	---
			1×			Delta	L2-L3	yes	yes	---	---
			2×			Delta	L3-L1	yes	yes	---	yes
			3×			Wye	L1-N	yes	---	yes	yes
			4×			Wye	L2-N	yes	---	---	---
			5×			Wye	L3-N	yes	---	---	yes



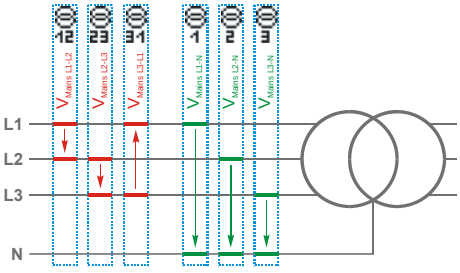


Table 2-3: Display - Measuring values

Mode

Softkeys "Mode"

By pressing the softkeys AUTO, MAN or the operating mode is selected. Depending on the application mode selected, different softkeys are enabled or disabled in the display. The active operation mode is displayed in the engine symbol. If the operation mode STOP is selected, the LED next to the push button is illuminated in addition to the mode being displayed inside the engine symbol.
Note: If the control unit has been configured so that only one operational mode is enabled, these softkeys will not be displayed and the operational mode cannot be changed.

STOP Operating mode

When STOP is selected, the engine is stopped.

AUTOMATIC Operating mode

When AUTOMATIC is selected, the control unit manages all engine start/stop and breaker control functions. These functions are performed in accordance with how the control is configured.

MANUAL Operating mode

When MANUAL is selected, all engine and breaker control is performed manually via the softkeys along the bottom of the display.

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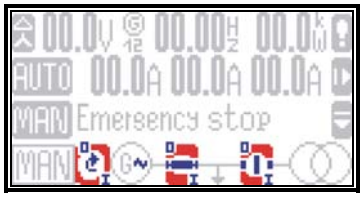
Operation (in MANUAL Operating Mode)

Softkeys "Manual Mode"



If the unit is in the MANUAL operating mode, the softkeys are enabled for manual operation of the engine and the power circuit breakers. The symbols "0" and "I" indicate if an open/close or a start/stop command is being processed at the moment.

Engine Start/Stop

Starting process: By pressing this softkey the engine is started.

- Successful: If the starting process was successful, the arrow rotates within this softkey, the "~" symbol appears next to the "G" symbol, and the gaps in the circle around the "**G**" symbol close after the delayed engine monitoring has expired.
- Unsuccessful: The "**I**" symbol is flashing during the starting process.

Stop process: Pressing the softkey again will stop the engine.

- Successful: If the stop process was successful, the "**0**" is displayed continuously and the rotating arrow and the "~" symbol disappear and the gaps in the circle around the "**G**" symbol will return.
- Unsuccessful: If the engine cannot be stopped, the arrow continues to turn within the softkey, the "~" symbol is displayed, and the "**0**" will continue to flash as long as a voltage is measured.

Power circuit breaker open/close (GCB/MCB)

Close: By pressing the softkey under the desired circuit breaker, it is closed.

- Successful: If the closing process was successful, the breaker symbol rotates horizontal and the "I" is displayed continuously within this softkey character.
- Unsuccessful: If the closing process was not successful, the breaker symbol remains vertical and the "I" will continue to flash within the softkey character until the control is able to close the breaker.

Open: To open this breaker this softkey is pressed while the breaker symbol is horizontal.

- Successful: If the opening process was successful, the breaker symbol rotates vertical and the "0" displayed continuously within this softkey character.
- Unsuccessful: If the opening process was not successful, the breaker symbol remains horizontal and the "0" will continue to flash within the softkey character until the control is able to open the breaker.

GCB open signal in application mode {1o}

Open: By pressing this softkey, a "GCB open" signal will be issued to a superordinate control or an external circuit. The dotted line in the switch symbol indicates that the switch is supposed to be closed, but this depends on the superordinate control or external circuit. As long as the button is pressed, a "GCB open" signal is issued and an "X" is indicated in the switch symbol.

Navigation

Softkeys "Navigation"

For navigation between the main screens the softkeys displayed in the right section are used. The softkeys are assigned with different functions.

Read alarm list

If alarms have occurred during operation this softkey character appears. By pressing this softkey the alarm list is displayed.

Leave current screen ("Escape" / "ESC")

By pressing this softkey character you exit and go to the previous screen. If the Escape key is used to leave a configuration screen, any unconfirmed changes made will not be stored.

Changing screen levels

These softkeys are used to navigate from screen to screen.

Activate configuration mode

To activate configuration mode this softkey is used to enter the main menu.

Navigation within the configuration

These softkeys scroll between parameters forward or backward, change the cursor position within a parameter, increase or decrease the current digit of the parameter andconfirm any modifications made within the parameters.

Increase/decrease display contrast

In the menu "display contrast" these softkey characters may be used to increase or decrease the contrast of the display. If the contrast has been reduced so much that the display is no longer visible, press and hold the STOP push button for at least 5 seconds. The contrast will be reset to the factory setting.

Acknowledgement

This softkey acknowledges an active alarm and turns off the horn in the main menu or the alarm list.

Jump to a sub-ordinate list (left side)

Pressing this softkey takes you to a list, which is below this menu level.

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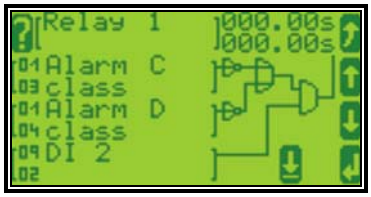
LogicsManager

Some parameters of the easYgen are configured via the *LogicsManager* (refer to Configuration Manual 37391). A typical *LogicsManager* screen is shown in the following. You may configure a logical operation using various command variables, signs, and logical operators to achieve the desired logical output.

LogicsManager Screen



For configuration of the *LogicsManager* the softkeys displayed in the right section are used. The softkey on the left opens a help screen. The softkeys are assigned with different functions.

Leave current screen ("Escape" / "ESC")

By pressing this softkey character you exit and go to the previous screen. If the Escape key is used to leave a *LogicsManager* configuration screen, any unconfirmed changes made will not be stored.

Change option

By pressing these softkey characters you may change the option of the selected *LogicsManager* parameter upwards or downwards.

Confirm selection

By pressing this softkey character you confirm the configured option of the selected *LogicsManager* parameter.

Select parameter

By pressing this softkey character you may select the *LogicsManager* parameter to be configured. Each time this softkey character is pressed, the parameter will be advanced.

Help button

By pressing this softkey character you get to a help screen, which displays the logical operators of the *LogicsManager*. You may change the help screens with the Down and Up buttons. You may return to the *LogicsManager* with the Escape button.

Chapter 3.
Functional Description

Overview

	Application Mode							
	{0}		{1o}		{1oc}		{2oc}	
Operation Mode	MAN	AUTO	MAN	AUTO	MAN	AUTO	MAN	AUTO
Operate the engine								
• Start engine by:								
the engine push button (Softkey)	YES	---	YES	---	YES	---	YES	---
the discrete inputs	---	YES	---	YES	---	YES	---	YES
emergency power (AMF)	---	---	---	---	---	---	---	YES
the interface	---	YES	---	YES	---	YES	---	YES
• Stop engine by:								
the STOP push button	YES	YES	YES	YES	YES	YES	YES	YES
the engine push button (Softkey)	YES	---	YES	---	YES	---	YES	---
the discrete inputs	---	YES	---	YES	---	YES	---	YES
emergency power (AMF)	---	---	---	---	---	---	---	YES
the interface	---	YES	---	YES	---	YES	---	YES
an alarm (i.e. overspeed lvl 2)	YES	YES	YES	YES	YES	YES	YES	YES
Operate GCB								
• close GCB								
the GCB push button (Softkey)	---	---	---	---	YES	---	YES	---
the discrete inputs	---	---	---	---	---	YES	---	YES
emergency power (AMF)	---	---	---	---	---	---	---	YES
the interface	---	---	---	---	---	YES	---	YES
an alarm (i.e. MCB failure)	---	---	---	---	---	---	---	YES
• open GCB								
the STOP push button	YES	YES	YES	YES	YES	YES	YES	YES
the GCB push button (Softkey)	---	---	YES	---	YES	---	YES	---
the discrete inputs	---	---	---	YES	---	YES	---	YES
emergency power (AMF)	---	---	---	---	---	---	---	YES
the interface	---	---	---	YES	---	YES	---	YES
an alarm (i.e. overvoltage)	---	---	YES	YES	YES	YES	YES	YES
Operate MCB								
• open MCB								
the MCB push button (Softkey)	---	---	---	---	---	---	YES	---
the discrete inputs	---	---	---	---	---	---	---	YES
emergency power (AMF + change to GCB)	---	---	---	---	---	---	---	YES
the interface	---	---	---	---	---	---	---	YES
• close MCB								
the MCB push button (Softkey)	---	---	---	---	---	---	YES	---
the discrete inputs	---	---	---	---	---	---	---	YES
emergency power (AMF)	---	---	---	---	---	---	---	YES
the interface	---	---	---	---	---	---	---	YES
an alarm (i.e. generator overvoltage)	---	---	---	---	---	---	---	YES

Table 3-1: Functional description - Overview

- **Application Mode** (page 25): depends on the application; defines the number/function of the breakers ({BM}, {1o}, {1oc}, {2oc}).
- **Operating Mode** (page 26): depends on the application; separates between STOP, MANUAL and AUTOMATIC.

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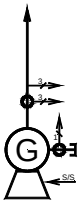
Application Modes

The application mode may be changed only during configuration with the code level 2 password. The most important features of the four application modes are illustrated in the following section. A description of the functions that are possible during each application mode can be found in the configuration manual (manual 37391). Table 3-1: Functional description - Overview describes which function is available in each application mode.

Application Mode {0} – Basic Mode



This application mode provides the following functions:

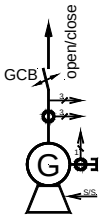
- operation of the engine (start/stop)
- monitoring and display of generator and engine parameters
- monitoring of selected parameters and protection of the generator and the engine

Application Mode {1o} – 0 CB Mode

Additionally, to the application mode {BM} the following functions are possible:

- opening the GCB by alarm messages also prior to shutting down the generator

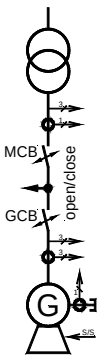
Application Mode {1oc} – 1 CB Mode



Additionally, to the application mode {1o} the following functions are possible:

- closing the GCB

Application Mode {2oc} – 2 CB Mode



Additionally, to the application mode {1oc} the following functions are possible:

- operating the MCB (open/close)
- emergency power (AMF automatic mains failure) operation

Operating Modes

Operating Mode STOP

NOTE

Selecting the operating mode STOP is not the same as an EMERGENCY STOP. In some cases the easYgen will perform additional logic functions, such as an engine cool down period, before the engine is stopped. It is recommended that an EMERGENCY STOP discrete input be utilized and programmed as an F class alarm.

In the STOP operating mode neither the engine nor the GCB can be operated. Dependent on the application mode the power circuit breakers cannot be operated. If the operating mode STOP has been selected while

the engine was already stopped

- The GCB will not be closed
- The fuel solenoid relay will not be enabled
- The discrete inputs and CAN bus commands are ignored
- The start push buttons (softkeys) are disabled (depending on the previous operating mode)
- The engine/generator monitoring remains de-activated (exception: all monitoring that is not delayed by the engine speed monitoring)

the engine was running

- The GCB is opened
  Requirements:
  - The easYgen is at least in application mode {1o} and
  - the GCB is closed
- The MCB will be closed
  Requirements:
  - The easYgen is at least in application mode {2oc}
  - the GCB is open
  - the MCB is enabled (via DI6 or parameter "Enable MCB = ALWAYS")
  - the parameter "close MCB in STOP mode" is configured to YES
- An engine cool down will be performed (the STOP LED is flashing)
- The fuel solenoid relay will be disabled
- The engine/generator monitoring will be de-activated (exception: all monitoring that is delayed by the engine speed monitoring)
- The control unit screen will display the operations as they are performed

the engine performs a cool down

- Pressing the STOP button again causes an immediate stop of the cool down and stops the engine

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Operating Mode MANUAL

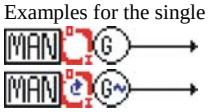
In the MANUAL operating mode (softkey "MAN") the engine and the power circuit breakers are operated via the push buttons along the bottom of the display (softkeys). All elements that may be operated via the softkeys have a black edge (). All other elements cannot be operated. The single line diagram in the lowest line will change according to the application mode.

The single line diagrams are displayed as follows:

Single line diagram for application mode {0}.
When MANUAL operating mode is selected a black outline softkey character will appear around the engine to indicate that the push buttons below this softkey character may be used to start and stop the engine. This is shown below highlighted in red for the following functions.

- Start the engine
- Stop the engine

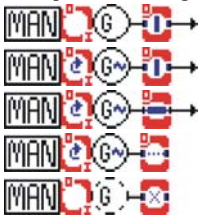
Examples for the single line diagrams



Single line diagram for application mode {1o}.
For a {1o} application both the engine and the GCB softkey characters appear with the following functions.

- Start the engine
- Stop the engine
- Open the GCB

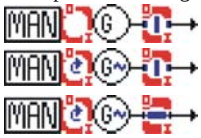
Examples for the single line diagrams



Single line diagram for application mode {1oc}.
For a {1oc} application both the engine and the GCB softkey characters appear with the following functions.

- Start the engine
- Stop the engine
- Open the GCB
- Close the GCB

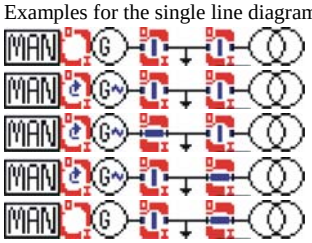
Examples for the single line diagrams



Single line diagram for application mode {2oc}.
For a {2oc} application both the engine, the GCB and the MCB softkey characters appear with the following functions.

- Start the engine
- Stop the engine
- Open the GCB
- Close the GCB
- Open the MCB
- Close the MCB

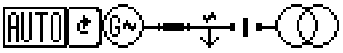
Examples for the single line diagrams



Operating Mode AUTOMATIC

In the AUTOMATIC operating mode, all engine, GCB, and/or MCB functions are operated via the discrete inputs, via an interface, or automatically by the control unit (i.e. a mains failure). The function of the easYgen depends on the configuration of the unit and how the external signals are used. The start /stop sequence of the engine is described in more detail in manual 37391.

The following states are indicated in the single line diagram.

Example for a typical single line diagram: 

Engine		Engine is stopped
		Engine is running (speed detected)
Generator		Generator monitoring is not active (engine monitoring delay is active)
		Generator does not supply voltage
		Generator supplies voltage (sine curve steady)
		Generator supplies voltage and is within the synchronization limits (sine curve oscillates)
GCB		GCB is closed
		GCB is open
		GCB is supposed to be closed (no "GCB open" signal issued); only in {1o}
		GCB is supposed to be open ("GCB open" signal issued); only in {1o}
Busbar		Busbar is not connected to a live source (de-energized)
		Busbar is connected to a live source (energized)
MCB		MCB is closed
		MCB is open
Mains		Mains does not supply voltage
		Mains supplies voltage (sine curve steady)
		Mains supplies voltage, is within the synchronization limits, and the mains settling time has expired (sine curve oscillates)

In the following text the main functions are briefly described.

START ENGINE

Remote start

The engine is started via a remote start signal.

A discrete input start requires.

- The AUTOMATIC operating mode is enabled.
- The function "start in AUTO" is assigned via the *LogicsManager* to a discrete input and the conditions are fulfilled (TRUE).
- This discrete input is energized (logically HIGH signal).
- A class C alarm or higher is not present (for explanation of the alarm classes refer to manual 37391).
- The engine is ready for operation.
- The GCB (application mode {1oc} and higher) is open.

An interface start requires.

- The AUTOMATIC operating mode is enabled.
- The necessary command of the interface protocol is set (for explanation of the interface protocol refer to manual 37391).
- A class C alarm or higher is not present (for explanation of the alarm classes refer to 37391).
- The engine is ready for operation.
- The GCB (application mode {1oc} and higher) is open.

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Mains fault

AMF / Auto mains failure operation (only in application mode {2oc})
If the AUTOMATIC operating mode is enabled and the application mode is configured to {2oc} (2-breaker logic) and the mains fail, the engine and the power circuit breakers will be operated according to the conditions in the following table.

An AMF start requires.

- The AUTOMATIC operating mode is enabled.
- The application mode is configured as {2oc}.
- The parameter "Emergency power" is configured as ON.
- The configured mains failure limits are reached.
- The configured delay times have expired.
- A class C alarm or higher is not present (for explanation of the alarm classes refer to 37391).
- The engine is ready for operation.

Status (prior to mains failure)			**Action** (order)		
Engine	**GCB**	**MCB**	**Engine**	**GCB**	**MCB**
0 (stopped)	**0** (open)	**0** (open)	**1** (start)	**2** (close)	---
	0 (open)	**1** (closed)	**1** (start)	**3** (close)	**2** (open)
1 (running)	**0** (open)	**0** (open)	---	**1** (close)	---
	0 (open)	**1** (closed)	---	**2** (close)	**1** (open)
	1 (closed)	**0** (open)	---	---	---

Table 3-2: Functional description - AMF conditions

Functional description of AMF conditions:

- If the engine is not running prior to a mains failure and both, the GCB and MCB are open, the following actions occur:
  1. The engine starts
  2. The GCB closes
  3. The load is assumed by the generator set

- If the engine is not running prior to a mains failure, the GCB is open, and the MCB is closed the following actions occur:
  1. The engine starts
  2. The MCB opens
  3. The GCB closes
  4. The load is assumed by the generator set

- If the engine is running prior to a mains failure, the GCB is open, and the MCB is open the following actions occur:
  1. The GCB closes
  2. The load is assumed by the generator set

- If the engine is running prior to a mains failure, the GCB is open, and the MCB is closed the following actions occur:
  1. The MCB opens
  2. The GCB closes
  3. The load is assumed by the generator set

- If the engine is running prior to a mains failure, the GCB is closed, and the MCB is open the following actions occur:
  1. The generator set continues to assume the load

Chapter 4.
Configuration

This chapter provides information "how to configure the unit via the LC display" as well as the description of all parameters that may be changed without a password. If you have the correct codes to configure the unit (this is verified via passwords), refer to manual 37391 for a description of all parameters, their setting range, and their influence to the operation of the unit.

Structure Of The parameters

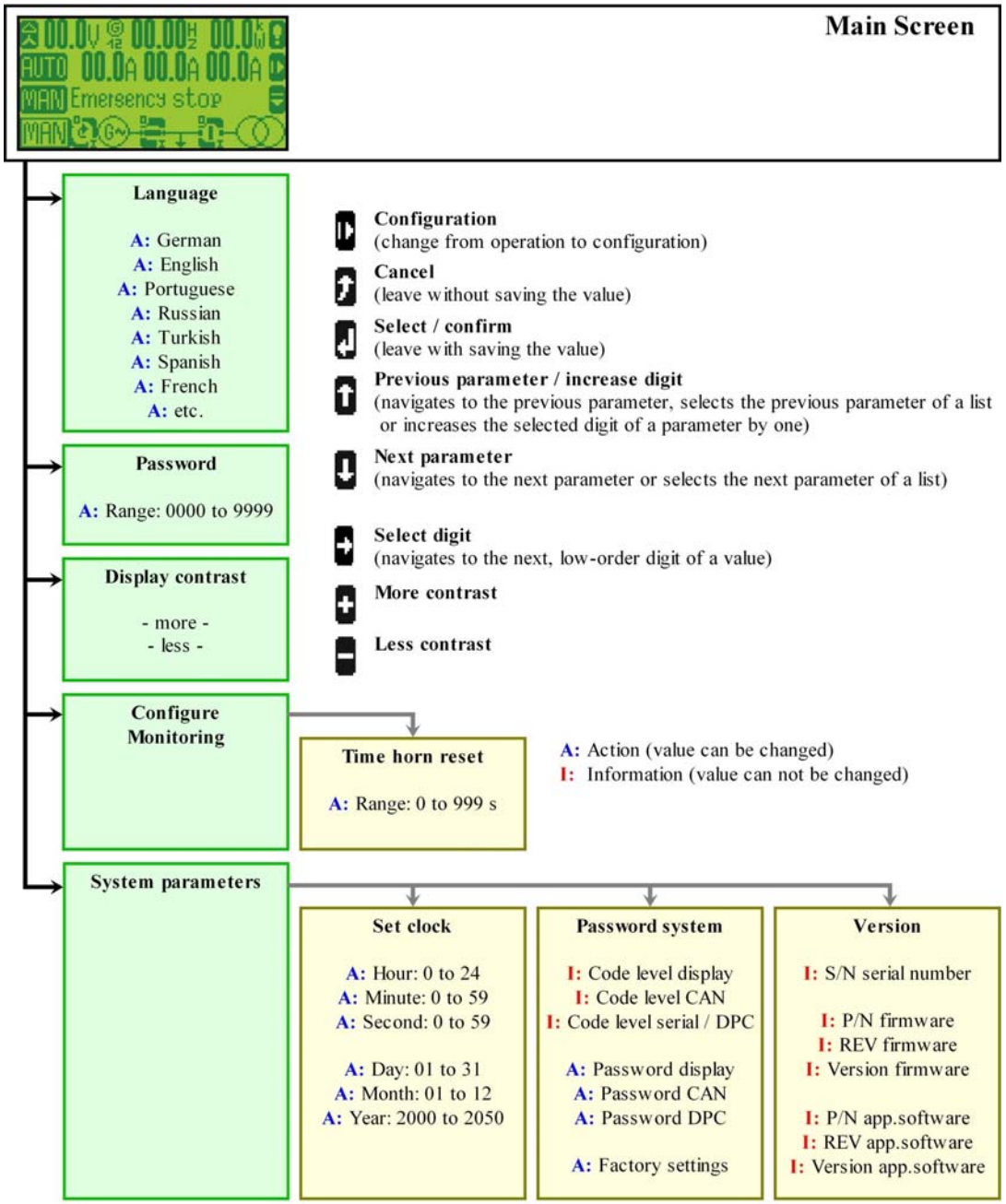

Figure 4-1: Configuration screens (overview)

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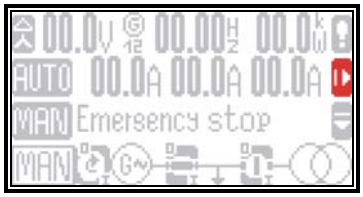
Access configuration menus



By pressing the softkey, the main menu will be displayed to permit configuration of the control unit.

Softkeys "Configuration - select parameter"

Navigation through the parameters is carried out using the softkeys and . To edit the selected parameter press . To save the edited parameter press . To exit the parameter without saving any changes press .

Return to the Main Screen/exit parameter without saving changes ("Escape")

Navigate.....Pressing the softkey will return the operator to the main display screen that shows monitored parameters. If the operator is configuring the control unit, this will return the user to the previous screen displayed.

Edit.....I If it is desired to exit a parameter without saving changes made there, press the softkey and the user will be returned to the previous screen.

Next parameter

Navigate.....This softkey permits the user to navigate down through the parameters. Only the parameters assigned by the active password will be displayed. The parameters that may be viewed without a password are described later in this manual.

Previous parameter/increase/change function

Navigate.....This softkey permits the user to navigate upwards through the parameters.

Edit.....If the desired parameter has been selected by pressing the softkey, and the cursor has been moved to the appropriate position via the softkey, the value of the digit may be increased by one using the softkey. If the digit has reached the highest numeral permitted for the placeholder, the unit will return to the lowest digit by pressing the softkey again.

Select parameter/input confirmation ("Enter")

Navigate.....A highlighted parameter may be enter into for configuration by pressing the softkey. This permits the changing of the configured value within the parameter.

Edit.....Any value that has been changed within a parameter is changed and stored in the unit memory by pressing the softkey.

Next digit of the selected parameter

If the parameter has a numeric value (i.e. the password) that is to be changed, the digits must be changed individually. The softkey permits navigation to each cursor position of the number to be changed. See the softkey symbols for an explanation of how to change the digit.

Parameters

NOTE

A description of all parameters, which may be edited/configured via the display, are described in manual 37391.

Language

EN	Language
DE	Language
PT	Language
RU	Language
TU	Language
SP	Language
FR	Language

Change language **{Language}**

{Language} . The selection of a language will affect the following text in the control unit:

- Text in the operating field which are not defined by an input (i.e. discrete inputs may be a user-defined text)
- The alarm list text
- All parameters which may be changed via the unit panel

Password

EN	Password
DE	Passwort
PT	Senha
RU	Пароль
TU	Şifre
SP	Consigna
FR	Code d'accès

Password for access via the unit panel **0000 to 9999**

A password must be entered to permit configuration of the unit via the unit panel. If a password is not entered only the displayed parameters may be edited. All other parameters and a description of their functions may be found in the manual 37391.

Display Contrast

EN	Change display contrast
DE	Displaykontrast ändern
PT	Contraste da tela
RU	Изменение контраста дисплея
TU	Kontrastı değiştir
SP	Cambiar contraste pantalla
FR	Config. contraste affichage

Change display contrast + / -

In parameter “Change display contrast” the display contrast may be increased or decrease using these softkey characters.

+ ..... Increase the display contrast.
- ..... Decrease the display contrast.
..... Performs a lamp test.

STOP ..... If the display contrast has been decreased to the point that it is no longer visible, press and hold the STOP button for at least 5 seconds. This will restore the contrast to the factory default setting.

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Deactivate Horn

EN	Time until horn reset
DE	Zeit Hupenreset
PT	Tempo de sirene ativa
RU	Время откл. сирены
TU	Kornayı kes zamansüresi
SP	Tiempo sirena
FR	Durée alarme sonore avant reset

Self acknowledgement of the horn signal **0 to 1.000 s**

A horn signal is issued and the alarm LED flashes when a fault condition occurs. This signal will be disabled when the configured time expires. This is the maximum time, for which a horn signal is active (it will also be deactivated if it is acknowledged before).

Code Levels

EN	Code level display
DE	Codeebene Display
PT	Nível senha display
RU	Код. уровень дисплей
TU	Kodseviye Ekran
SP	Nivel consigna pantalla
FR	Niv. code affichage

Code level via display **Info**

This value displays the code level that is currently active for access via the front panel.

EN	Code level CAN port
DE	Codeebene CAN Schnittstel.
PT	Nível senha CAN
RU	Код.уровень CAN интерфейс
TU	Kodseviye CAN ara birim
SP	Nivel consigna interfaz CAN
FR	Niv. code interfaceCAN

Password CAN-Bus **Info**

This value displays the code level that is currently active for access via the CAN bus.

EN	Code level serial
DE	Codebene serielle Schnittstel
PT	Nível senha RS232
RU	Код.уров.послед. интерфейс
TU	Kodseviye seriel ara birim
SP	Niv.consigna interf. RS232/DPC
FR	Niv. code interface serielle

Code level RS-232 (DPC interface) **Info**

This value displays the code level that is currently active for access via the serial RS-232 (DPC) interface.

Password

EN	Password
DE	Passwort
PT	Senha
RU	Пароль
TU	Şifre
SP	Consigna
FR	Code d'accès

Password for access via display **0000 to 9999**

A password must be entered to permit configuration of the unit via the front panel. If a password is not entered only the displayed parameters may be edited. All other parameters and a description of their functions may be found in the manual 37391.

EN	Password CAN
DE	Passwort CAN
PT	Senha CAN
RU	Пароль CAN
TU	Şifre CAN
SP	Consigna CAN
FR	Code d'accès CAN

Password for access via CAN **0000 to 9999**

A password must be entered to permit configuration of the unit via the CAN bus. If a password is not entered only the displayed parameters may be edited. All other parameters and a description of their functions may be found in the manual 37391.

EN	Password RS232
DE	Passwort RS232
PT	Senha RS232
RU	Пароль RS232
TU	Şifre RS232
SP	Consigna RS232/DPC
FR	Code d'accès RS232

Password for access via DPC **0000 to 9999**

A password must be entered to permit configuration of the unit via the DPC interface. If a password is not entered only the displayed parameters may be edited. All other parameters and a description of their functions may be found in the manual 37391.

Factory (Default) Values

EN	Factory settings
DE	Werkseinstellung
PT	Configuração deusina
RU	Завод. параметры
TU	Fabrika değerler
SP	Configuración de fábrica
FR	Parametres d'usine

Factory setting **YES/NO**

The factory settings (default values) may be loaded. Select YES to enable the following screen to be displayed. It is possible to load the factory settings (default values) for all displayed parameters.

EN	Set default values
DE	Standardwerte
PT	Valores padrão
RU	Стандарт. параметры
TU	Standart değerler
SP	Valores por defectro
FR	Valeurs standards

Set default values **YES/NO**

Entering YES overwrites the current configured values with the default values. Only those parameters will be reset, which are permitted to change in the selected code level.

Real-Time Clock - Time

EN	Hour
DE	Stunden
PT	Horas
RU	Часы
TU	saat
SP	Horas
FR	Heure

Adjust clock time: hour **0 to 23**

The hour of the current time is set here. Example:
0 ..... 0th hour of the day.
23 ..... 23rd hour of the day.

EN	Minute
DE	Minuten
PT	Minutos
RU	Минуты
TU	dakika
SP	Minutos
FR	Minute

Adjust clock time: minute **0 to 59**

The minute of the current time is set here. Example:
0 ..... 0th minute of the hour.
59 ..... 59th minute of the hour.

EN	Second
DE	Sekunden
PT	Segundos
RU	Секунды
TU	saniye
SP	Segundos
FR	Seconde

Adjust clock time: second **0 to 59**

The second of the current time is set here. Example:
0 ..... 0th second of the minute.
59 ..... 59th second of the minute.

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Real-Time Clock - Date

EN	Day
DE	Tag
PT	Dia
RU	День
TU	gün
SP	Día
FR	Jour

Adjust date: day **1 to 31**

The day of the current date is set here. Example:
1.....1st day of the month.
31.....31st day of the month.

EN	Month
DE	Monat
PT	Mês
RU	Месяц
TU	ay
SP	Mes
FR	Mois

Adjust date: month **1 to 12**

The month of the current date is set here. Example:
1.....1st month of the year.
12.....12th month of the year.

EN	Year
DE	Jahr
PT	Ano
RU	Год
TU	yıl
SP	Año
FR	Année

Adjust date: year **0 to 99**

The year of the current date is set here. Example:
0.....Year 2000.
99.....Year 2099.

Resetting the Maintenance Counter

Resetting the maintenance counter is performed as described under the screens "Maintenance in..." and "Maintenance Reset" on page 16.

Please observe that resetting the maintenance counter is only possible, if the unit is in the required code level (or higher). The required code level depends on the setting of the parameter "Code level for reset maintenance" (refer to manual 37391).

Appendix A. Messages

Status Messages

Message in LeoPC1 Message in the display	Meaning
Aux.serv.prerun **Aux.serv.prerun**	**Prerun of the auxiliary operation is active** Before the engine is started the signal "aux. services prerun" is enabled, so that all required equipment which is necessary for the operation of the engine can be initialized, started or switched.
Aux. services **Aux. services**	**Auxiliary operation is active** Before the engine is completely stopped, auxiliary operations are enabled. These operations ensure that required equipment which is necessary for the operation of the engine continues to run (i.e. electric cooling fan).
Cool down **Cool down**	**Coasting of the engine is active** The no load operation is performed prior to the stopping of the engine. The no load operation is utilized to cool the engine.
Crank protect **Crank protect**	**Starter protection** To prevent the starter from being damaged by an engine that is rotating, a crank protection delay is active to ensure that the engine has time to stop rotating.
Critical mode **Critical mode**	**Critical mode (Sprinkler operation) is active** The sprinkler operation is activated. The exact description of the conditions and effects of the sprinkler operation are described in manual 37391.
Emergency run **Emergency run**	**Emergency power operation** {2oc} After the control unit detects that a mains fault has occurred, the engine is started after the emergency delay timer expires. The MCB is opened, the GCB is closed, and the generator set assumes the load. If the generator set is already running, operations continue until the emergency power operation conditions no longer exist. If the mains return, the mains settling timer becomes active first (see below).
Emerg/Critical **Emerg/Critical**	**Emergency operation during active critical operation** {2oc} Critical operation is activated. Emergency operation has priority over critical operation. If a mains failure occurs during critical operation, the generator will supply the busbar (i.e. the MCB will be opened and the GCB will be closed).
GCB dead bus cls **GCB dead bus cls**	**Dead bus closing of the GCB** {1oc}, {2oc} The GCB is closed onto the de-energized busbar. This is actuated either by an absence of the MCB (operation mode {1oc}) or by "Reply: MCB is open". During commissioning of a system, ensure that there are no other sources that may energize the busbar. If the status of the busbar is not known, verify that the busbar is de-energized by other means.
Idle run active **Idle run active**	**The control is in idle mode** No undervoltage, underfrequency, and underspeed monitoring is performed in idle mode. The analog inputs react on the limit values, which are configured for the idle mode.
Ignition **Ignition**	**Enable the ignition** {Gas engine} After the purging operation and before the fuel solenoid is opened.
Mains settling **Mains settling**	**Mains settling time is active** {2oc} When the control unit detects that the mains fault is no longer present and power has been restored, the mains settling timer begins counting down. If the mains are stable after the expiration of the timer (the mains voltage has not fallen below or risen over the configured monitoring limits), the load is transferred from the generator supply to the mains supply.
MCB dead bus cls **MCB dead bus cls**	**Dead bus closing of the MCB** {2oc} The MCB is closed onto the de-energized busbar. This is actuated by the "Reply: GCB is open". During commissioning of a system, ensure that there are no other sources that may energize the busbar. If the status of the busbar is not known, verify that the busbar is de-energized by other means.
Preglow **Preglow**	**Preglow the engine is active** {Diesel engine} The diesel engine is preheated prior to starting.

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Message in LeoPC1 Message in the display	Meaning
Start **Start**	**Start engine is active** After the "Prerun auxiliary operation" expires, the engine is started according to the configured start logic (Diesel or gas engine). When the start sequence is active, various relays are enabled and representative signals are passed via the CAN bus to a secondary engine control.
Start – Pause **Start - Pause**	**Start pause while starting the engine is active** If the engine could not be started, the controller will pause for the configured time prior to attempting to issuing a start command again.
Stop engine **Stop engine**	**Engine will be stopped** The engine will be stopped. If no speed or generator frequency is measured/detected, a restart will be blocked for the set time. This message is displayed during the stop process.
Turning **Turning**	**Purging operation is active** {Gas engine} Before the fuel solenoid opens and the ignition of the gas engine is energized the remaining fuel, that may be present in the combustion chamber, will be removed by a purging operation. The starter turns the engine without enabling the ignition for a specified time to complete the purging operation. After the purging process, the ignition is energized.

Alarm Messages

Message in LeoPC1 Message in the display	Meaning
Amber warning lamp **Amber warning lamp**	**Amber warning lamp, J1939 interface** This watchdogs monitors, whether a specific alarm bit is received from the CAN J1939 interface. This enables to configure the control in a way that a reaction is caused by this bit (e.g. warning, shutdown).
Analog input x Lev.1 **Lv1:**	**Analog input {x}, limit value 1** The analog input has exceeded / fallen below the limit value 1 (depending on the configuration) for at least the configured time and did not fall below / exceed the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Analog input x Lev.2 **Lv2:**	**Analog input {x}, limit value 2** The analog input has exceeded / fallen below the limit value 2 (depending on the configuration) for at least the configured time and did not fall below / exceed the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Batt.overvolt. Lev.1 **Batt.overvolt.1**	**Battery overvoltage, limit value 1** The battery voltage has exceeded the limit value 1 for battery overvoltage for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Batt.overvolt. Lev.2 **Batt.overvolt.2**	**Battery overvoltage, limit value 2** The battery voltage has exceeded the limit value 2 for battery overvoltage for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Batt.undervolt. Lev.1 **Batt.undervolt.1**	**Battery undervoltage, limit value 1** The battery voltage has fallen below the limit value 1 for battery undervoltage for at least the configured time and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Batt.undervolt. Lev.2 **Batt.undervolt.2**	**Battery undervoltage, limit value 2** The battery voltage has fallen below the limit value 2 for battery undervoltage for at least the configured time and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
CAN-Fault J1939 **CAN-Fault J1939**	**Interface alarm J1939** The communication with the ECU via the CAN bus interface has been interrupted and no data can be transmitted or received over the bus. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
CAN Open Fault **CAN Open Fault**	**Interface alarm CAN Open** The communication with external expansion boards via the CAN Open interface has been interrupted and no data can be transmitted or received over the bus. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).

Message in LeoPC1 Message in the display	Meaning
Flexible Limit x **Flexible Limit x**	**Flexible threshold {x}, overrun / underrun** The actual value of the monitored analog input has exceeded / fallen below the threshold (depending on the configuration) for at least the configured time and did not fall below / exceed the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
GCB fail to close **GCB fail to close**	**GCB failed to close** The easYgen has attempted to close the GCB the configured maximum number of attempts and failed. Depending on the configuration, the easYgen will continue to attempt to close the GCB as long as the conditions for closing the GCB are fulfilled. Additionally, the alarm has not been acknowledged.
GCB fail to open **GCB fail to open**	**GCB failed to open** The easYgen is still receiving the reply GCB closed" after the GCB open monitoring timer has expired.
Gen.ground fault Lev.1 **Ground fault 1**	**Generator ground current, limit value 1** The measured or calculated ground current has exceeded the limit value 1 for the generator ground current for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.ground fault Lev.2 **Ground fault 2**	**Generator ground current, limit value 2** The measured or calculated ground current has exceeded the limit value 2 for the generator ground current for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overcurrent Lev.1 **Gen. overcurr. 1**	**Generator overcurrent, limit value 1** The generator current has exceeded the limit value 1 for the generator overcurrent for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overcurrent Lev.2 **Gen. overcurr. 2**	**Generator overcurrent, limit value 2** The generator current has exceeded the limit value 2 for the generator overcurrent for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overcurrent Lev.3 **Gen. overcurr. 3**	**Generator overcurrent, limit value 3** The generator current has exceeded the limit value 3 for the generator overcurrent for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overfrequency Lev.1 **Gen.overfreq. 1**	**Generator overfrequency, limit value 1** The generator frequency has exceeded the limit value 1 for generator overfrequency for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overfrequency Lev.2 **Gen.overfreq. 2**	**Generator overfrequency, limit value 2** The generator frequency has exceeded the limit value 2 for generator overfrequency for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overload Lev.1 **Gen. Overload 1**	**Generator overload, limit value 1** The generator power has exceeded the limit value 1 for generator overload for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overload Lev.2 **Gen. Overload 2**	**Generator overload, limit value 1** The generator power has exceeded the limit value 1 for generator overload for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overvoltage Lev.1 **Gen.overvolt. 1**	**Generator overvoltage, limit value 1** The generator voltage has exceeded the limit value 1 for generator overvoltage for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.overvoltage Lev.2 **Gen.overvolt. 2**	**Generator overvoltage, limit value 2** The generator voltage has exceeded the limit value 2 for generator overvoltage for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.reverse power Lev.1 **Gen. Rv/Rd pow.1**	**Generator reverse power, limit value 1** / **Generator reduced power, limit value 1** The generator power has exceeded the limit value 1 for generator reverse power / generator reduced power for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.reverse power Lev.2 **Gen. Rv/Rd pow.2**	**Generator reverse power, limit value 2** / **Generator reduced power, limit value 2** The generator power has exceeded the limit value 2 for generator reverse power / generator reduced power for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).

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Message in LeoPC1 Message in the display	Meaning
Gen.rotating field alarm **Gen. phase rot. misw.**	**Generator rotating field mismatch** The generator rotating field does not correspond with the configured direction. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.unbalanced load Lev.1 **Unbal. load 1**	**Generator unbalanced load, limit value 1** The generator current has exceeded the limit value 1 for generator unbalanced load for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.unbalanced load Lev.2 **Unbal. load 2**	**Generator unbalanced load, limit value 2** The generator current has exceeded the limit value 2 for generator unbalanced load for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.underfrequency Lev.1 **Gen.underfreq. 1**	**Generator underfrequency, limit value 1** The generator frequency has fallen below the limit value 1 for generator underfrequency for at least the configured time and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.underfrequency Lev.2 **Gen.underfreq. 2**	**Generator underfrequency, limit value 2** The generator frequency has fallen below the limit value 2 for generator underfrequency for at least the configured time and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.undervoltage Lev.1 **Gen.undervolt. 1**	**Generator undervoltage, limit value 1** The generator voltage has fallen below the limit value 1 for generator undervoltage for at least the configured time and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.undervoltage Lev.2 **Gen.undervolt. 2**	**Generator undervoltage, limit value 2** The generator voltage has fallen below the limit value 2 for generator undervoltage for at least the configured time and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Gen.voltage asymmetry **Gen. asymmetry**	**Excessive voltage asymmetry** The generator phase voltages have higher differences between each other than the configured limit value.
Inv.time ov.curr. **Inv.time ov.curr.**	**Generator inverse time-overcurrent** Current is monitored depending on the parameter "Gen.current measuring". The tripping time depends on the measured current. The higher the current is the faster the tripping time according to a defined curve. According to IEC 255 three different characteristics are available: normal, highly, and extremely inverse.
Mains rotating field alarm **Mains phase rot. misw.**	**Mains rotating field mismatch** The mains rotating field does not correspond with the configured direction. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Maintenance days over **Mainten. days exceeded**	**Maintenance days exceeded** The generator run time has exceeded the configured number of days since the last maintenance period. Additionally, the alarm has not been acknowledged.
Maintenance hours over **Mainten. hours exceeded**	**Maintenance hours exceeded** The generator run time has exceeded the configured number of hours since the last maintenance period. Additionally, the alarm has not been acknowledged.
MCB fail to close **MCB fail to close**	**MCB failed to close** The easYgen has attempted to close the MCB the configured maximum number of attempts and failed. Depending on the configuration, the easYgen will continue to attempt to close the GCB as long as the conditions for closing the MCB are fulfilled. Additionally, the alarm has not been acknowledged.
MCB fail to open **MCB fail to open**	**Failed MCB open** The easYgen is still receiving the reply MCB closed" after the MCB open monitoring timer has expired.
Overspeed Lev.1 **Overspeed 1**	**Engine overspeed, limit value 1** The engine speed has exceeded the limit value 1 for engine overspeed for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Overspeed Lev.2 **Overspeed 2**	**Engine overspeed, limit value 2** The engine speed has exceeded the limit value 2 for engine overspeed for at least the configured time and did not fall below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).

Message in LeoPC1 Message in the display	Meaning
Red stop lamp **Red stop lamp**	**Red stop lamp, J1939 interface** This watchdogs monitors, whether a specific alarm bit is received from the CAN J1939 interface. This enables to configure the control in a way that a reaction is caused by this bit (e.g. warning, shutdown).
Shutdown malfunction **Shutdown malfct.**	**Stop alarm of the engine** The engine failed to stop when given the stop command.. When a stop command is issued a timer starts a countdown. If speed is still detected when this timer expires the controller recognizes an unsuccessful stop of the engine. An unsuccessful stop of the engine is determined if speed (measured by the generator frequency, the MPU, or the LogicsManager "ignition speed") is detected 30 seconds after the stop signal has been issued.
Speed det. alarm **Speed det. alarm**	**Difference in frequency/speed measurement alarm** The speed differential between the generator frequency (ascertained by the generator voltage measurement) and the engine speed (measured by the MPU) has exceeded the configured limit value / differential frequency for at least the configured time and has not fallen below the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES). The alarm may also be triggered if the LogicsManager "ignition speed" is enabled and no electrical frequency is detected as well as the other way round.
Start fail **Start fail**	**Failure of engine to start alarm** The generator set has failed to start after the configured number of attempts. Depending on the configuration, no more start attempt will be carried out until the alarm is acknowledged. In Sprinkler operation, the configured number of start attempts is performed, before this message is displayed.
Timeout dead bus op. **Timeout dead bus op.**	**Dead bus operation timeout** The dead bus operation monitoring issues an alarm if ignition speed is exceeded and the limits for closing the GCB are not exceeded within the configured delay. No alarm will be issued in idle mode.
Underspeed Lev.1 **Underspeed 1**	**Engine underspeed, limit value 1** The engine speed has fallen below the limit value 1 for engine underspeed and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Underspeed Lev.2 **Underspeed 2**	**Engine underspeed, limit value 2** The engine speed has fallen below the limit value 2 for engine underspeed and has not exceeded the value of the hysteresis. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).
Unintended stop **Unintended stop**	**Unintended Stop** The easYgen expects the generator to be running but no longer detects voltage or frequency.
Wire break Analog inp.x **Wb:**	**Analog input {x}, wire break** During measurement of the analog input a wire break was detected. Additionally, the alarm has not been acknowledged (unless the "Self acknowledgement" is configured YES).

The analog input error messages, discrete input, and external discrete inputs may be assigned customer defined text. These texts will appear in the alarm messages when the inputs are active or have surpassed configured set points.
The default descriptions are:
Analog inp.1
Digital input 1
Ext. Digital input1
The text for the analog inputs will appear when Level 1/2 (Lv1/2) has been exceeded or fallen below the configured set point or a wire break (Wb) has been detected.

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Please include the manual number from the front cover of this publication.

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